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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,281

09/18/2006

Masaaki Kuranuki

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EXAMINER

OMAR, AHMED H

ART UNIT

PAPER NUMBER

2858

MAIL DATE

DELIVERY MODE

02/12/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Supplemental  
Notice of Allowability**

Application No.

10/593,281

Examiner

AHMED OMAR

Applicant(s)

KURANUKI ET AL.

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2858

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE filed on 10/21/2009.
2. ☒ The allowed claim(s) is/are 1,3,6-16 and 18-22.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |  |  |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)   | 5. <input type="checkbox"/> Notice of Informal Patent Application                      |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date _____    | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|  | 9. <input type="checkbox"/> Other _____.   |

/Edward Tso/  
Primary Examiner, Art Unit 2858

## DETAILED ACTION

### EXAMINER'S AMENDMENT

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it must be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with TAKASHI SAITO (Reg. # L0123; tel#202-756-8000) on 5 January 2010.

This examiner's amendment replaces all previous amendments.

The application has been amended as follows:

1. Amend **claim 1** as follows:

**“A power system comprising: an electrochemical device; a load device; a power generator; and a charge/discharge controller of said electrochemical device,**

**said electrochemical device comprising a positive electrode, a negative electrode, and a liquid electrolyte or a solid electrolyte,**

**said electrochemical device having a charge/discharge curve that has at least one step, a given step of said at least one step having an inflection point, a voltage corresponding to the inflection point or a point adjacent to the inflection point being set as a threshold value, the inflection point existing greater than 0 % and less than 100% of a remaining capacity,**

**said charge/discharge controller being configured to control charge/discharge of said electrochemical device, and**

**said power system further comprises a comparator that compares the voltage of said electrochemical device with said threshold value, wherein based on an output of said comparator, said charge/discharge controller causes said electrochemical device to be charged whenever the voltage is lower than said threshold value and causes said electrochemical device to be discharged whenever the voltage is higher than said threshold value so that the voltage of said electrochemical device approaches said threshold value;**

**wherein, when the voltage equals to the threshold value, said charge/discharge controller selects charging if the electrochemical device is being charged upon the output of the comparison result, and select discharging if the electrochemical device is being discharged upon the output of the comparison result”**

2. Cancel **claims 2 and 17.**

3. Amend **claim 10** as follows:.

The power system in accordance with claim 1, further comprising:

a parameter detector that detects at least one parameter selected from the group consisting of charge/discharge current, temperature and internal impedance of said electrochemical device;  
and

a field adjustor that adjusts the relation between the voltage of said electrochemical device and said threshold value based on the detected parameter.

4. Amend **claim 16** as follows:

**“A method for managing a power system that comprises an electrochemical device, a load device, and a power generator,**

**said electrochemical device comprising a positive electrode, a negative electrode, and a liquid electrolyte or a solid electrolyte,**

**said electrochemical device having a charge/discharge curve that has at least one step, a given step of said at least one step having an inflection point, a voltage corresponding to the inflection point or a point adjacent to the inflection point being set as a threshold value, the inflection point existing greater than 0 % and less than 100% of a remaining capacity, and**

**said method comprising controlling charge/discharge of said electrochemical device, wherein said controlling charge/discharge comprises the steps of:**

**measuring a voltage of said electrochemical device;**

**comparing the measured voltage with said threshold value;**

**based on a result of the comparing, charging said electrochemical device whenever the measured voltage is lower than said threshold value and discharging said electrochemical device whenever the measured voltage is higher than said threshold value such that the voltage of said electrochemical device approaches said threshold value, and**

**wherein said controlling charge/discharge further comprises the steps of:**

**when the measured voltage equals to said threshold value, charging said electrochemical device if the electrochemical device is being charged upon the measuring the voltage, and discharging the electrochemical device if the electrochemical device is being discharged upon the measuring the voltage.”**

### Reasons for Allowance

Claims 1 and 16 are allowed. The following is the examiner's statement for allowance"

The prior art does not disclose or suggest the following: The prior art does not disclose or suggest the following: **"when the measured voltage equals to said threshold value, charging said electrochemical device if the electrochemical device is being charged upon the measuring the voltage, and discharging the electrochemical device if the electrochemical device is being discharged upon the measuring the voltage"** in combination with the remaining limitations of independent claims 1 and 16. Dependant claims 3, 6-15 and 18-22 are allowable for the same reason.

The examiner found YAMAMOTO (US 4,883,724) and TSUJINO (US 5,180,961) to be the closest prior art to the claimed invention. YAMAMOTO discloses a control unit for a fuel cell generation system in which a fuel cell is used to provide power to a load and also to charge a battery which has an inflection point, the battery is charged up to a predetermined point (i.e. more than 80% of battery capacity), when the battery reaches that threshold value the battery stops receiving charging power and is discharged as the load requirement increases.

TSUJINO discloses a battery charging apparatus such that battery charging is controlled to stop when the battery is fully charged such charging is detected by monitoring the charging characteristics of the battery and full charge is indicated once the rate of change of voltage is less than a certain value (i.e. inflection point is received). However neither reference nor their combination suggests the above missing limitation, and it would not have been obvious to one of

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ordinary skill in the art at the time of the invention to modify any of the references in view of the other or any other additional references in order to meet the above missing limitations.

### **Conclusion**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ahmed Omar whose telephone number (571)270-7165. The examiner can normally be reached between 7:00 am-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Edward Tso/  
Primary Examiner, Art Unit 2858

/AHMED OMAR/  
Examiner, Art Unit 2858